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United States Department of Agriculture

Animal and Plant Health Inspection Service

Veterinary Services

APHIS 91-39

National Tick Surveillance Program

Calendar Year 1984

USDA
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National Tick Surveillance Program
Calendar Year 1984

During calendar year 1984, the collection and submission of ticks from native and imported animals plus plant and animal material was 29 percent less than in 1983. There were 7,213 collections in 1984, 10,207 in 1983, 9,086 in 1982, 9,381 in 1981, 7,763 in 1980, and 11,553 in 1979.

Interception of a Heartwater Vector in Texas

In June 1984, *Amblyomma hebraeum,* a vector of heartwater (*Cowdria ruminantium*), was collected from a female black rhinoceros on a cattle ranch near Linn, Texas. This rhino was one of three rhinos on the ranch. These three rhinos were part of a consignment of five rhinos imported into the United States from South Africa in March 1984. The other two rhinos in the consignment were shipped to an exotic game ranch near Glen Rose, Texas. The black rhinoceroses, an endangered species, were brought to the United States as part of an experimental breeding program.

The ticks were collected by Dr. Sherri L. Huntress, a veterinarian from the Gladys Porter Zoo in Brownsville, Texas. One of the female rhinos died unexpectedly and during the postmortem examination, Dr. Huntress noticed several "unusual" ticks which were collected and forwarded to the National Veterinary Services Laboratories, Ames, Iowa, where they were identified as male specimens of *A. hebraeum,* the South African bont tick.

Because of possible exposure of cattle to the tick-infested rhino, a State quarantine was placed on the ranch near Linn, Texas. Since there were no cattle on the exotic game ranch near Glen Rose, this ranch was not quarantined. A team of entomologists from Veterinary Services was sent to Texas to inspect the rhinos for additional ticks and to conduct a tick survey on both ranches. The entomologists were assisted by experienced personnel from Veterinary Services Fever Tick Eradication Program, Laredo, Texas.

Examination of the rhinos by the entomologists and tick eradication specialists on the ranch near Linn revealed additional male specimens of *A. hebraeum* as well as native ticks (*Amblyomma cajennense*). No *A. hebraeum* were found on the rhinos at the Glen Rose ranch; however, another native species, *Amblyomma americanum,* was found on the two rhinos. Surveys of the pastures on both ranches were negative for *A. hebraeum.*

After examination, the rhinos on both ranches were thoroughly sprayed with 0.125 percent coumaphos. The pasture used by the rhinos at the ranch near Linn was sprayed with 0.25 percent chlorpyrifos. A followup investigation was conducted on both ranches a month after the first investigation and no further evidence of *A. hebraeum* was found. In addition, wildlife and livestock on the ranch near Linn were periodically sampled throughout 1984 for ticks by Veterinary Services tick eradication specialists. No *A. hebraeum* were found on any of the animals examined.

The impact of the interception of *A. hebraeum* was minimized by three factors: 1) the results of the investigation indicated that only male *A. hebraeum* were transported from Africa; 2) rhinos are nonruminants and are therefore not susceptible to heartwater; and 3) the rhinos came from an area in South Africa reportedly free of heartwater.

There are two principal avenues by which foreign animal diseases may enter the United States: 1) importation of diseased animals or 2) importation of foreign animal disease vectors. These risks are greatly reduced when dealing with wild or domestic animals for which the U.S. Department of Agriculture has jurisdiction. However, rhinos and some other nonruminants are not presently regulated by the U.S. Department of Agriculture. Thus, rhinos, elephants, large cats, and various other classes of nondomesticated animals may presently enter the United States without being inspected for parasites or diseases. The increasing volume and rapidity of commerce via air transport have intensified the danger of the introduction and establishment of exotic vectors. This is particularly true with the recent trend towards placing zoological animals in "natural-type" environments that directly expose susceptible domestic livestock and native wildlife. Importers of zoological animals, State, and Federal regulatory personnel should be aware of this danger and take necessary precautions to prevent the introduction and establishment of exotic parasites and diseases.

***Boophilus microplus* in Puerto Rico**

The cooperative eradication program between the U.S. Department of Agriculture and the Commonwealth of Puerto Rico Department of Agriculture to eliminate *B. microplus* gained momentum in 1984. The program continued the systematic treatment of infested herds from two headquarters, one on the eastern and the other on the western end of the island. The eastern headquarters is located at Juncos; the western headquarters is at Arecibo. During 1984 there were some 1,279 herds comprising over 42,000 animals under treatment and supervision by the Juncos station. There are 3,501 total premises in the Juncos quarantine area. The Arecibo quarantine area has 4,004 premises and during 1984 over 1,500 herds with more than 17,000 animals were under treatment.

The total tick eradication budget for 1984, which included funds from the USDA, APHIS; the Commonwealth; and

other USDA (Food and Nutrition Service), was $11,622,150. This funding permitted the program to obtain the necessary vehicles, equipment, supplies, and personnel to actively pursue the eradication effort.

Amblyomma variegatum in Puerto Rico

The tropical bont tick eradication effort continued to make progress in 1984. There were only seven laboratory-confirmed collections of *A. variegatum* for 1984. Six of the collections were from cattle and one was from a horse. Two collections were from Cabo Rojo, four were from Ponce, and a single collection was made on the island of Vieques.

The seven laboratory-confirmed collections in 1984 compared to 38 confirmed collections in 1983 and 50 in 1982. At the end of 1984 there were 46 premises under quarantine for exposure or infestation by *A. variegatum.*

Boophilus Tick Eradication in Texas

The cattle fever tick situation continued to look good in 1984. Compared to recent years tick eradication activities were successful and relatively uneventful. There were no major outbreaks of *Boophilus* ticks in either the Tick Eradication Quarantine Area or the Free Area.

During 1984, 163 animals originating from Mexico were apprehended by Tick Eradication personnel along the Texas-Mexico border. This included 95 cattle and 68 horses of which 31 of the cattle and 15 of the horses were infested with *Boophilus* ticks.

The weather in 1984 was drier than normal. As a result, the Rio Grande River was low. Because of this, the stray livestock were allowed to cross the river into Texas. The smuggling of livestock continued as a problem with the threat of the introduction of *Boophilus* ticks being greater from smuggled Mexican livestock than from stray Mexican livestock.

Veterinary Services Committee on the Importation of Zoological Animals (VSCIZA)

A committee of experts were formed in 1984 to review the policies, regulations, and legal authorities involved in the importation of wild zoological animals into the United States. This committee also addressed the issue of ectoparasites entering the United States on nonregulated zoological animals.

Several incidents have occurred in recent years involving exotic ectoparasites found on unregulated animal species after importation into the United States. Animal health authorities expressed concern that these unregulated wild zoological animals had the potential of introducing both foreign animal diseases and exotic vectors. These introduced parasites and diseases could become established in the United States and endanger domestic livestock as well as native wildlife.

The VSCIZA carefully reviewed the overall problem and issued an interim report on September 14, 1984, which made recommendations and options for handling the problem. In November 1984, the recommendations of the VSCIZA were submitted to four committees of the U.S. Animal Health Association (USAHA) at the annual meeting held in Forth Worth, Texas. The four committees of the USAHA which received the proposals included the Epizootic Attack Committee, Foreign Animal Disease Committee, Import-Export Committee, and Zoological Animals Committee. The USAHA issued an overall report in support of the recommendations of the VSCIZA. In early 1985 Veterinary Services established another committee to develop regulations to implement many of the VSCIZA recommendations.

Livestock Tick Research in 1984

The first full year of operation of the new USDA, ARS, Cattle Fever Tick Research Laboratory at Mission, Texas, produced progress on several research problems. The efficacy of a 50 percent flowable formulation of phosmet was tested by dipping *Boophilus annulatus*-infested cattle in a vat charged with concentrations of 0.03, 0.06, or 0.1 percent active ingredient (AI). The percent control obtained with each concentration was 97, 99, 99.7, respectively. In a related study a dipping vat was charged with 0.06 percent AI flowable phosmet to evaluate the stability and manageability of the material in a vat used frequently. The phosmet in the flowable formulation proved to be unstable and in approximately 2 months after the vat was charged, 98 percent of the acaricide had apparently been lost through degradation.

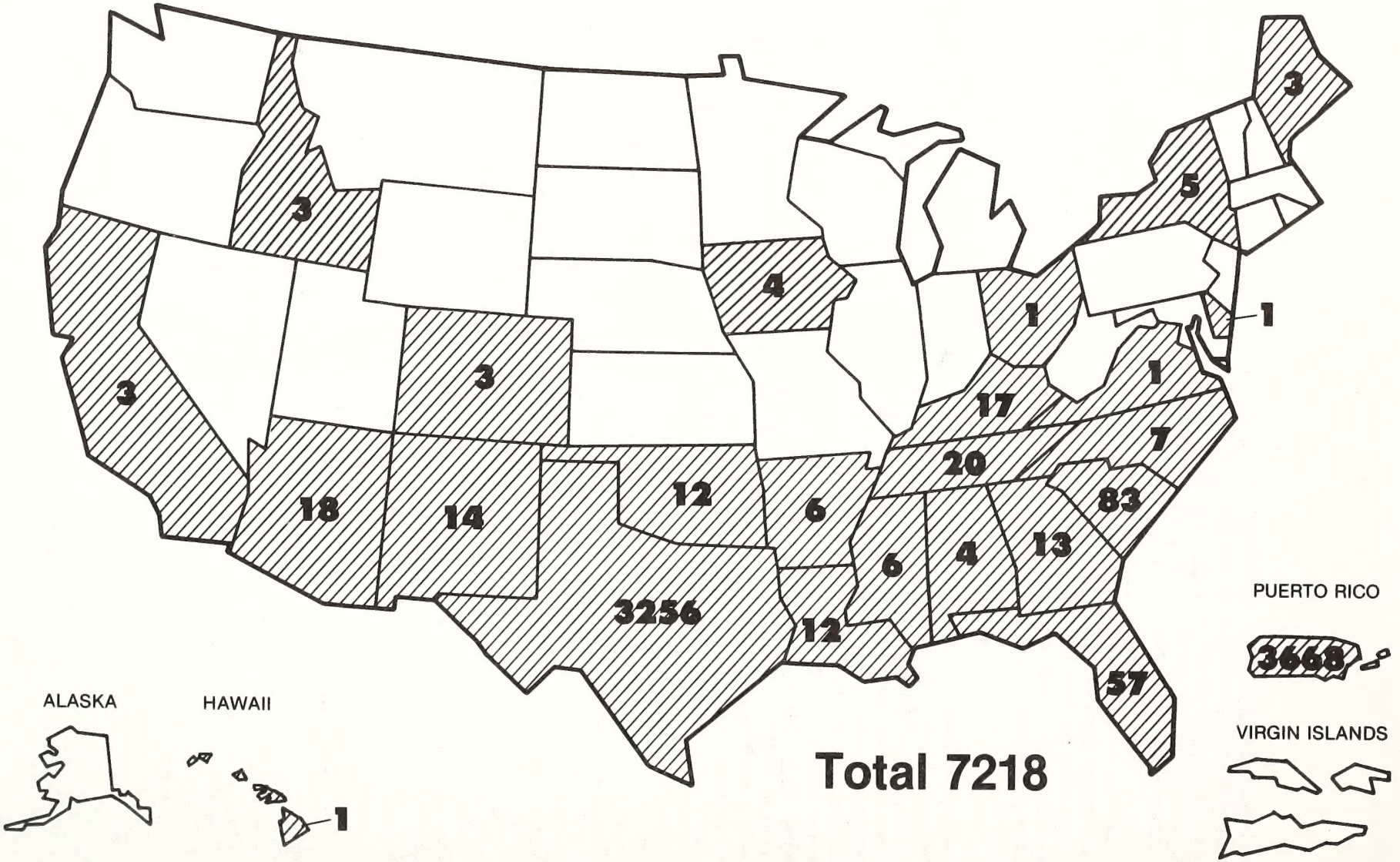
There is continuing concern about the possibility of finding acaricide-resistant ticks. Consequently, laboratory studies continue to evaluate the susceptibility to acaricides of cattle fever ticks from outbreaks detected in south Texas and Puerto Rico. Ticks from 10 locations along the Texas border with Mexico and two from Puerto Rico were evaluated and found to be completely susceptible.

Four experimental plots, each containing approximately 6 acres, have been fenced and infested with *B. microplus* for a small-scale field test of the sterile hybrid male *Boophilus* eradication technique. This summer, after determining that ticks are well established, hybrid larvae will be released periodically onto cattle in two of the plots while the other

two plots will serve as controls. An electrophoretic technique will be used to determine the proportion of hybrid and pure strain ticks in samples of ticks from cattle and thus will provide a means of monitoring progress toward the elimination of the pure strain *B. microplus* from the pastures. Dr. Larry Hilburn, the geneticist at the U.S. Livestock Insects Laboratory at Kerrville, and Dr. Paul Sattler, a research associate, are investigating the genetics of *Boophilus* ticks, including the hybrids from crosses between *B. Microplus* and *B. annulatus,* in an effort to discover a method for improving the sterile hybrid procedure.

After 5 years of full-time research in support of the tick eradication program in Puerto Rico, Dr. Glen Garris was reassigned to the Lone Star Tick Research Laboratory at Poteau, Oklahoma. However, Dr. Garris is still involved in cooperative research on the ecology and control of the tropical bont tick with French research workers on the island of Guadeloupe. Dr. Garris and other scientists in the Tick and Scabies Research Unit will make regular visits to Puerto Rico as part of continuing ARS efforts to provide research support for the eradication program. Most of the future research for the program in Puerto Rico will be conducted at the laboratory in Mission.

Tick Collections From All Hosts
CY 1984



REPORT OF TICKS COLLECTED

PERIOD: Calendar Year 1984

HOST: All Hosts

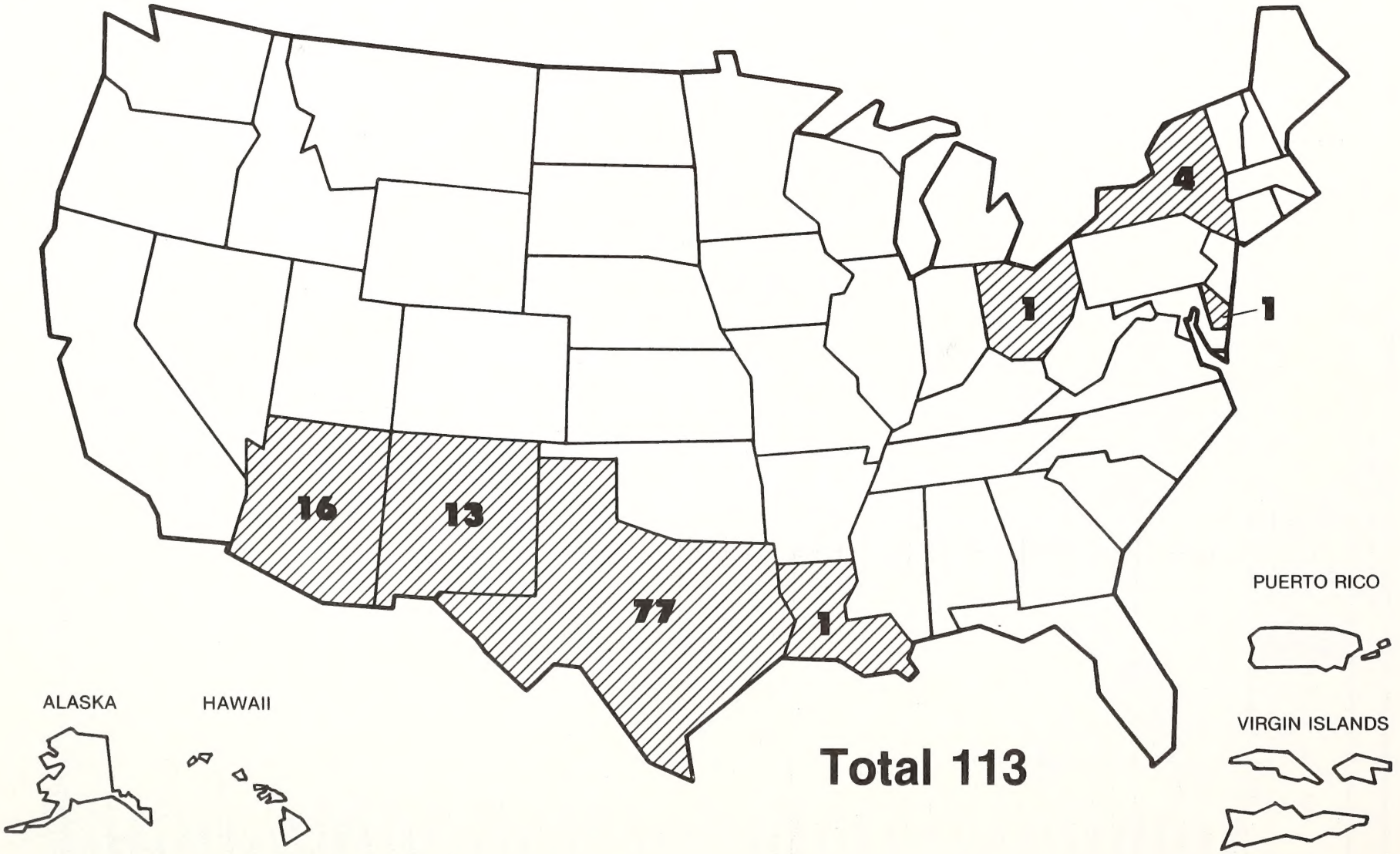
STATE	TOTAL	Cattle	Dogs	Horses & Mules	Zoo Animals & Misc. Hosts	Native Wildlife	Animals & Products Offered for Entry
TOTAL	7218	5741	234	760	107	263	113
Alabama	4	4					
Alaska							
Arizona	18	1	1				16
Arkansas	6					6	
California	3	1	1			1	
Colorado	3		1	1		1	
Connecticut							
Delaware	1						1
Florida	57	8	1	25	1	22	
Georgia	13	1				12	
Hawaii	1					1	
Idaho	3	1	1		1		
Illinois							
Indiana							
Iowa	4		4				
Kansas							
Kentucky	17					17	
Louisiana	12					11	1
Maine	3				3		
Maryland							
Massachusetts							
Michigan							
Minnesota							
Mississippi	6	6					
Missouri							
Montana							
Nebraska							
Nevada							
New Hampshire							
New Jersey							
New Mexico	14					1	13
New York	5				1		4
North Carolina	7	7					
North Dakota							
Ohio	1						1
Oklahoma	12	6				6	
Oregon							
Pennsylvania							
Rhode Island							
South Carolina	83	1	20	1	17	44	
South Dakota							
Tennessee	20	16			4		
Texas	3256	2329	200	457	53	140	77
Utah							
Vermont							
Virginia	1		1				
Washington							
West Virginia							
Wisconsin							
Wyoming							
Puerto Rico	3668	3360	4	276	27	1	
Virgin Islands							

ANH FORM 5-55 MAY 1971

REPLACES ADE FORM 5-55, DEC 1964, WHICH IS OBSOLETE

USDA, APHIS, VS
NVSL, AMES, IOWA

Tick Collections From Animals and Products Offered for Entry CY 1984



REPORT OF TICKS COLLECTED

PERIOD: Calendar Year 1984

HOST: Animals and Products Offered for Entry

STATE	TOTAL	AMBLYOMMA AMERICANUM	AMBLYOMMA CAJENNENSE	AMBLYOMMA IMITATOR	AMBLYOMMA MACULATUM	AMBLYOMMA SPP.	ARGAS PERSICUS	BOOPHILUS ANNULATUS	BOOPHILUS MICROPLUS	BOOPHILUS SPP.	DERMACENTOR ALBIPICTUS	DERMACENTOR ANDERSONI VARIABILIS & OCCIDENTALIS	DERMACENTOR NITENS	DERMACENTOR SPP.	HAEMAPHYSALIS LEPORISPALUSTRIS	IXODES COOKEI	IXODES PACIFICUS	IXODES SCAPULARIS	IXODES SPP.	ORNITHODOROS SPP.	OTOBIUS MEGNINI	RHIPICEPHALUS SANGUINEUS	RHIPICEPHALUS SPP.	MISCELLANEOUS SPP.
TOTAL	113		2	1		1		15	14	12	40		2				15	1				2		3	2	1	2
ARIZONA																											
Douglas	8										8BO																
Tucson	8																7BH[d]							1CD			
DELAWARE																											
Dover	1																										1BG[x]
LOUISIANA																											
New Orleans	1																								1PF		
NEW YORK																											
JFK	3																			2FL[o]						1FL[k]	
Rock Tavern	1																										1AF[e]
NEW MEXICO																											
Columbus	13										10BO		2BO				1BO[a]										
OHIO																											
Columbus	1																								1HG		
TEXAS																											
Brownsville	5								3BO	2BO**																	
Del Rio	13							1BO	2BO	1BO**	7BO						2BO**										
Eagle Pass	28							8BO	2BO	7BO**	1DH 7BO						3BO**										
El Paso	7										5BO						1BO**							1BO			
Laredo	24		2BO	1BO		1BO**		2DH 4BO	7BO	2BO**	2BO						1BO**	1BO**						1BO			

ANH FORM 5-55 MAY 1971

REPLACES ADE FORM 5-55, DEC 1964, WHICH IS OBSOLETE

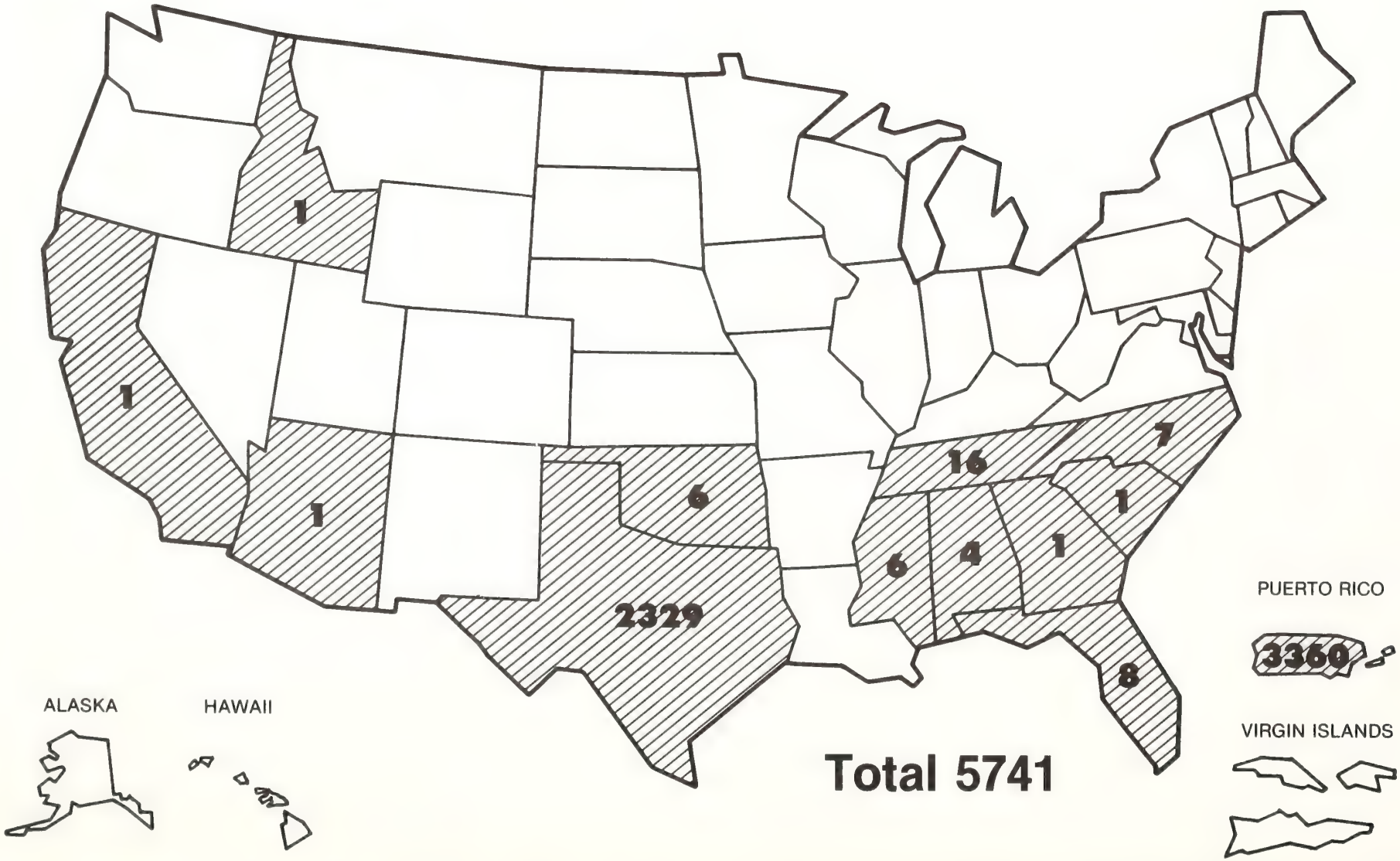
Key to Hosts
AF African Grey Parrot
BG Baggage
BH Bighorn Sheep
BO Bovine
CD Coues Deer
DH Deer Hide
FL Flowers (cut)
HG Household Goods
PF Palm Fronds

Key to Species
a Dermacentor parumapertus
d Dermacentor hunteri
e Haemaphysalis hoodi
k Rhipicephalus kochi
o Ixodes pilosus
x Hyalomma excavatum

** Nymphal stage

USDA, APHIS, VS
NVSL, AMES, IOWA

Tick Collections From Cattle
CY 1984



REPORT OF TICKS COLLECTED

PERIOD: Calendar Year 1984 | HOST: Cattle

STATE	TOTAL	AMBLYOMMA AMERICANUM	AMBLYOMMA CAJENNENSE	AMBLYOMMA IMITATOR	AMBLYOMMA MACULATUM	AMBLYOMMA SPP.	ARGAS PERSICUS	BOOPHILUS ANNULATUS	BOOPHILUS MICROPLUS	BOOPHILUS SPP.	DERMACENTOR ALBIPICTUS	DERMACENTOR SIMILIS (=D. FERRISI, D. FENTONI & D. PARUMAPERTUS)	DERMACENTOR NIGROLINEATUS	DERMACENTOR NITENS	DERMACENTOR OCCIDENTALIS	DERMACENTOR VARIABILIS	DERMACENTOR SPP.	HAEMAPHYSALIS LEPORIS-PALUSTRIS	IXODES COOKEI	IXODES PACIFICUS	IXODES SCAPULARIS	IXODES SPP.	ORNITHODOROS SPP.	OTOBIUS MEGNINI	RHIPICEPHALUS SANGUINEUS	RIPICEPHALUS SPP.	MISCELLANEOUS SPP.
TOTAL	5741	326	229	9	793	40		9	3157	3	178		29	202		306		1			10			438	11		
Alabama	4	2			1																1						
Alaska																											
Arizona	1										1																
Arkansas																											
California	1																							1			
Colorado																											
Connecticut																											
Delaware																											
Florida	8	3			3																2						
Georgia	1															1											
Hawaii																											
Idaho	1										1																
Illinois																											
Indiana																											
Iowa																											
Kansas																											
Kentucky																											
Louisiana																											
Maine																											
Maryland																											
Massachusetts																											
Michigan																											
Minnesota																											
Mississippi	6				6																						
Missouri																											
Montana																											
Nebraska																											
Nevada																											
New Hampshire																											
New Jersey																											
New Mexico																											
New York																											
North Carolina	7															7											
North Dakota																											
Ohio																											
Oklahoma	6	2											1								1			2			
Oregon																											
Pennsylvania																											
Rhode Island																											
South Carolina	1	1																									
South Dakota																											
Tennessee	16	8														8											
Texas	2329	310	229	9	783	19[n] 15**		9	7	3**	176		28			290		1			6			435	9		
Utah																											
Vermont																											
Virginia																											
Washington																											
West Virginia																											
Wisconsin																											
Wyoming																											
Puerto Rico	3360					6[v]			3150					202											2		
Virgin Islands																											

ANH FORM 5-55 MAY 1971

REPLACES ADE FORM 5-55, DEC 1964, WHICH IS OBSOLETE

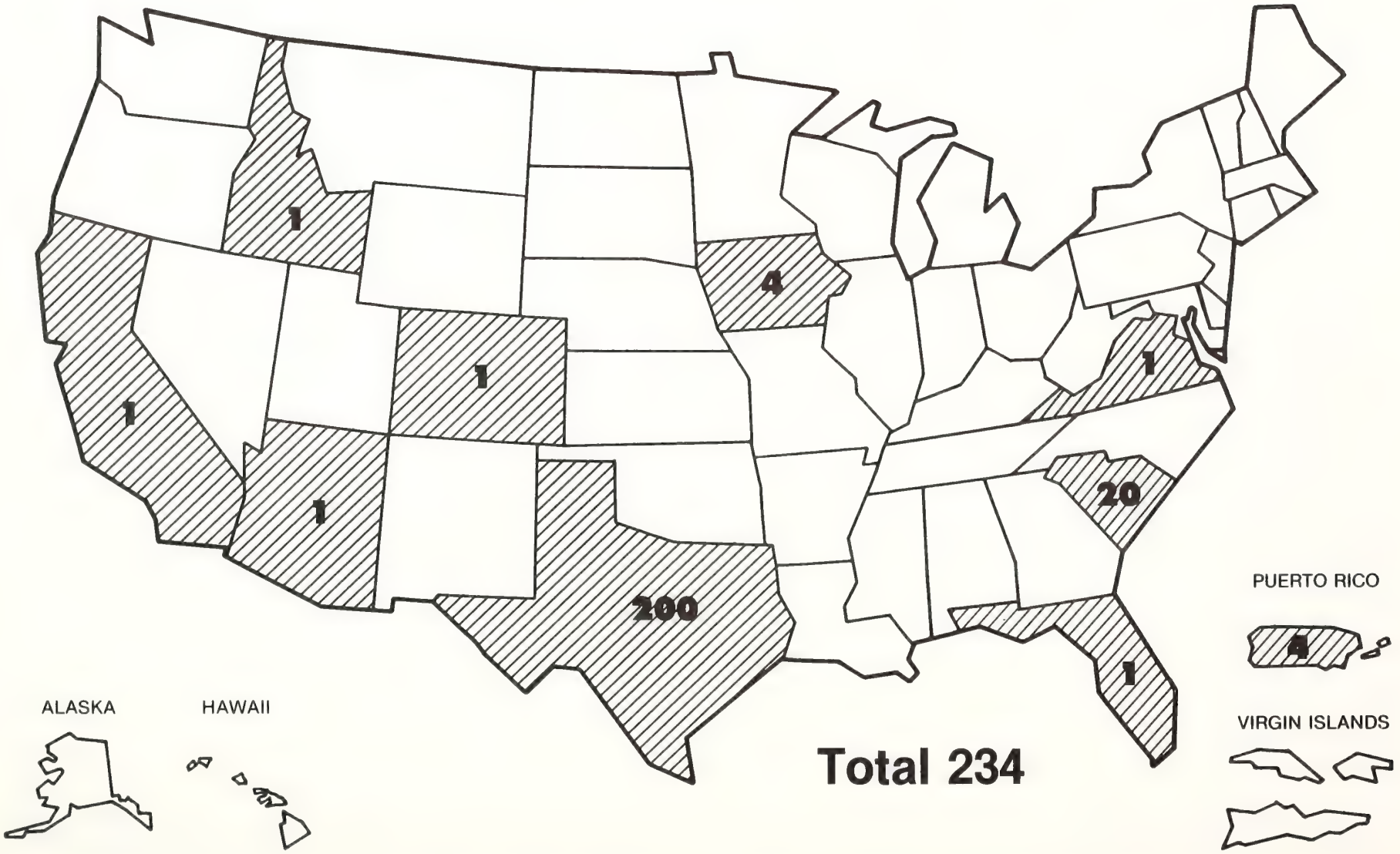
Key to Species

n Amblyomma inornatum
v Amblyomma variegatum

**Nymphal Stage

USDA, APHIS, VS
NVSL, AMES, IOWA

Tick Collections From Dogs
CY 1984



REPORT OF TICKS COLLECTED

PERIOD: Calendar Year 1984

HOST: Dogs

STATE	TOTAL	AMBLYOMMA AMERICANUM	AMBLYOMMA CAJENNENSE	AMBLYOMMA IMITATOR	AMBLYOMMA MACULATUM	AMBLYOMMA SPP.	ARGAS PERSICUS	BOOPHILUS ANNULATUS	BOOPHILUS MICROPLUS	BOOPHILUS SPP.	DERMACENTOR ALBIPICTUS	DERMACENTOR ANDERSONI STILES	DERMACENTOR ANDERSONI & D. VARIABILIS	DERMACENTOR HYDROMINEALIS	DERMACENTOR NITENS	DERMACENTOR OCCIDENTALIS	DERMACENTOR VARIABILIS	DERMACENTOR SPP.	HAEMAPHYSALIS LEPORIS PALUSTRIS	IXODES COOKEI	IXODES PACIFICUS	IXODES SCAPULARIS	IXODES SPP.	ORNITHODOROS SPP.	OTOBIUS MEGNINI	RHIPICEPHALUS SANGUINEUS	RHIPICEPHALUS SPP.	MISCELLANEOUS SPP.
TOTAL	234	6		1	13	3										54					1	13				143		
Alabama																												
Alaska																												
Arizona	1																									1		
Arkansas																												
California	1															1												
Colorado	1																									1		
Connecticut																												
Delaware																												
Florida	1				1																							
Georgia																												
Hawaii																												
Idaho	1																				1*							
Illinois																												
Indiana																												
Iowa	4															4												
Kansas																												
Kentucky																												
Louisiana																												
Maine																												
Maryland																												
Massachusetts																												
Michigan																												
Minnesota																												
Mississippi																												
Missouri																												
Montana																												
Nebraska																												
Nevada																												
New Hampshire																												
New Jersey																												
New Mexico																												
New York																												
North Carolina																												
North Dakota																												
Ohio																												
Oklahoma																												
Oregon																												
Pennsylvania																												
Rhode Island																												
South Carolina	20				1											3						7				9		
South Dakota																												
Tennessee																												
Texas	200	6		1	11	1** 2n										45						6				128		
Utah																												
Vermont																												
Virginia	1															1												
Washington																												
West Virginia																												
Wisconsin																												
Wyoming																												
Puerto Rico	4																									4		
Virgin Islands																												

ANH FORM S-55 MAY 1971

REPLACES ADE FORM S-55, DEC 1964, WHICH IS OBSOLETE

Key to Species

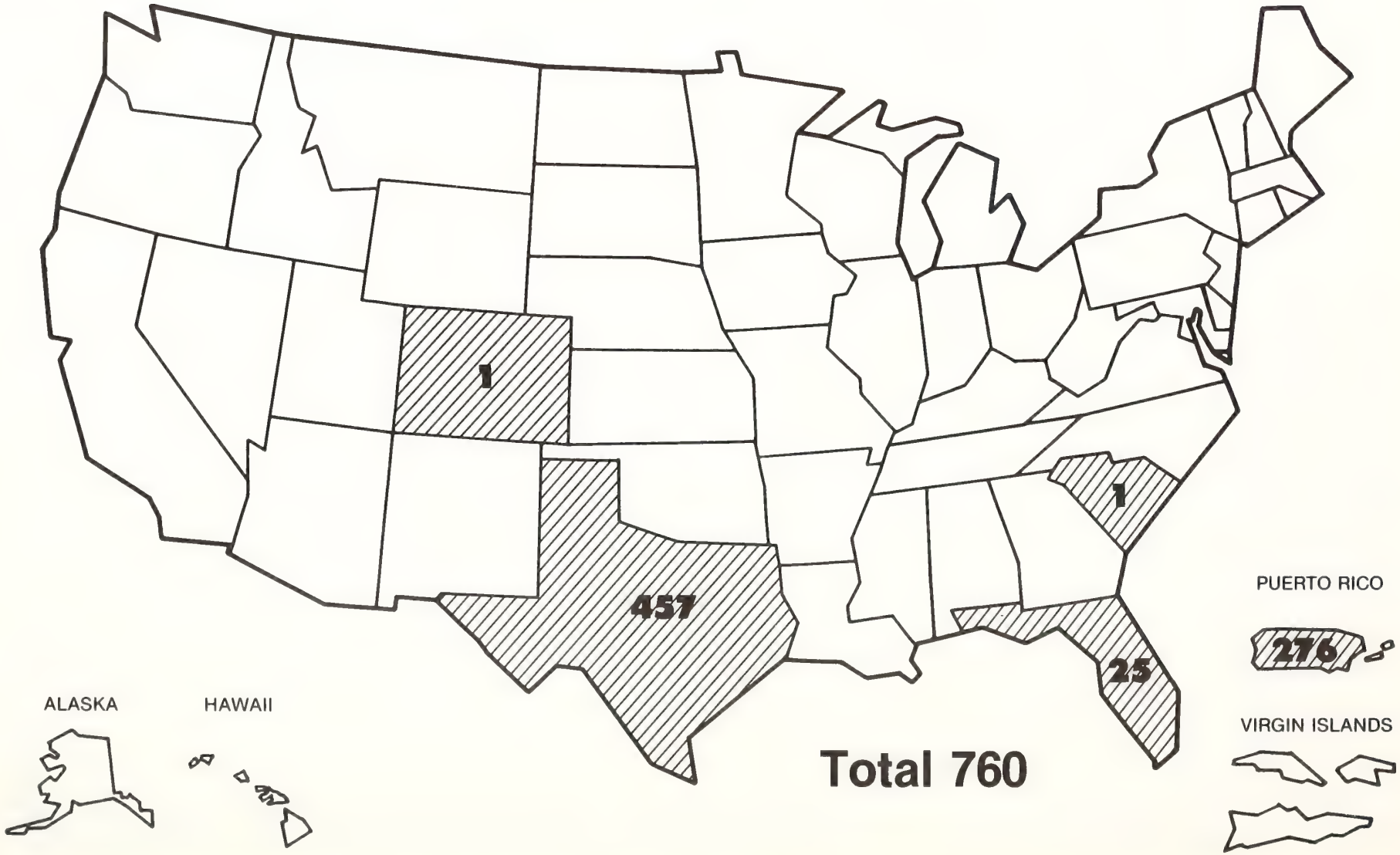
n Amblyomma inornatum

*Dog had visited Portland, Oregon

**Nymphal stage

USDA, APHIS, VS
NVSL, AMES, IOWA

Tick Collections From Horses and Mules
CY 1984



REPORT OF TICKS COLLECTED

PERIOD: Calendar Year 1984

HOST: Horses and Mules

STATE	TOTAL	AMBLYOMMA AMERICANUM	AMBLYOMMA CAJENNENSE	AMBLYOMMA IMITATOR	AMBLYOMMA MACULATUM	AMBLYOMMA SPP.	ARGAS PERSICUS	BOOPHILUS ANNULATUS	BOOPHILUS MICROPLUS	BOOPHILUS SPP.	DERMACENTOR ALBIPICTUS	DERMACENTOR SPICATUS (=PARUMAPERTUS) & D. LENIS (=A. CAYENNENSE)	DERMACENTOR NIGROLINEATUS	DERMACENTOR NITENS	DERMACENTOR OCCIDENTALIS	DERMACENTOR VARIABILIS	DERMACENTOR SPP	HAEMAPHYSALIS LEPORISPALUSTRIS	IXODES COOKEI	IXODES PACIFICUS	IXODES SCAPULARIS	IXODES SPP.	ORNITHODOROS SPP.	OTOBIUS MEGNINI	RHIPICEPHALUS SANGUINEUS	RHIPICEPHALUS SPP.	MISCELLANEOUS SPP.
TOTAL	760	24	23	1	67	2		6	30		54		9	260		268					3			1	12		
Alabama																											
Alaska																											
Arizona																											
Arkansas																											
California																											
Colorado	1																							1			
Connecticut																											
Delaware																											
Florida	25				8									11		1					3				2		
Georgia																											
Hawaii																											
Idaho																											
Illinois																											
Indiana																											
Iowa																											
Kansas																											
Kentucky																											
Louisiana																											
Maine																											
Maryland																											
Massachusetts																											
Michigan																											
Minnesota																											
Mississippi																											
Missouri																											
Montana																											
Nebraska																											
Nevada																											
New Hampshire																											
New Jersey																											
New Mexico																											
New York																											
North Carolina																											
North Dakota																											
Ohio																											
Oklahoma																											
Oregon																											
Pennsylvania																											
Rhode Island																											
South Carolina	1															1											
South Dakota																											
Tennessee																											
Texas	457	24	23	1	59	1[n]		6	1		54		9	3		266									10		
Utah																											
Vermont																											
Virginia																											
Washington																											
West Virginia																											
Wisconsin																											
Wyoming																											
Puerto Rico	276					1[v]			29					246													
Virgin Islands																											

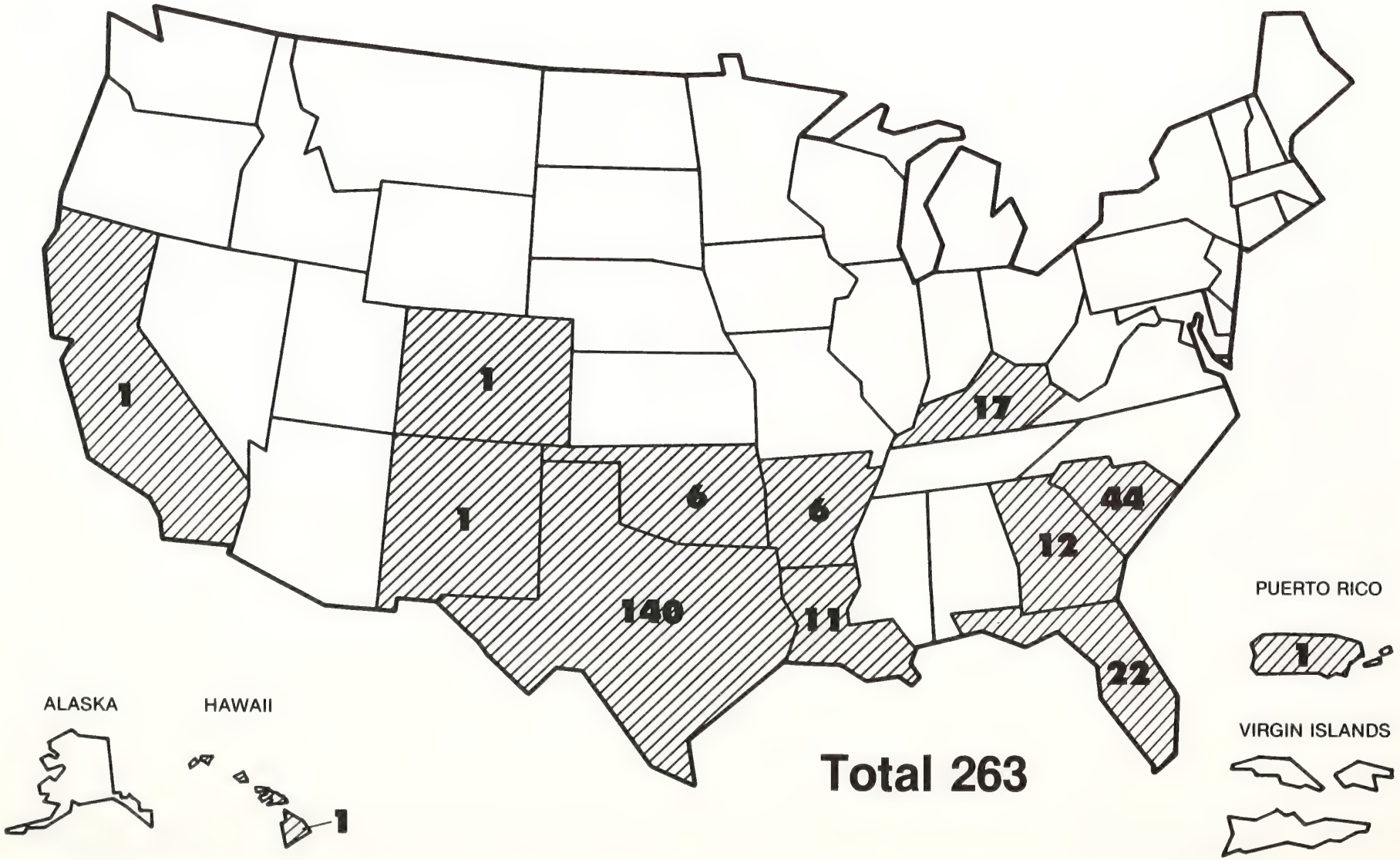
ANH FORM 5-55 MAY 1971

REPLACES ADE FORM 5-55, DEC 1964, WHICH IS OBSOLETE

Key to Species
n Amblyomma inornatum
v Amblyomma variegatum

USDA, APHIS, VS
NVSL, AMES, IOWA

Tick Collections From Native Wildlife
CY 1984



REPORT OF TICKS COLLECTED

PERIOD: Calendar Year 1984 | HOST: Native Wildlife

STATE	TOTAL	AMBLYOMMA AMERICANUM	AMBLYOMMA CAJENNENSE	AMBLYOMMA IMITATOR	AMBLYOMMA MACULATUM	AMBLYOMMA SPP.	ARGAS PERSICUS	BOOPHILUS ANNULATUS	BOOPHILUS MICROPLUS	BOOPHILUS SPP.	DERMACENTOR ALBIPICTUS	DERMACENTOR SILVARUM (=PICTUS) & D. VENUSTUS (=MARXI)	DERMACENTOR NIGROLINEATUS	DERMACENTOR NITENS	DERMACENTOR OCCIDENTALIS	DERMACENTOR VARIABILIS	DERMACENTOR SPP.	HAEMAPHYSALIS LEPORISPALUSTRIS	IXODES COOKEI	IXODES PACIFICUS	IXODES SCAPULARIS	IXODES SPP.	ORNITHODOROS SPP.	OTOBIUS MEGNINI	RHIPICEPHALUS SANGUINEUS	RHIPICEPHALUS SPP.	MISCELLANEOUS SPP.
TOTAL	263	67	6	2	13	12					12		33		28	2	63				21	2		2			
Alabama																											
Alaska																											
Arizona																											
Arkansas	6	5D																			1BC						
California	1																1R										
Colorado	1										1E																
Connecticut																											
Delaware																											
Florida	22	4D 8SD***			3SD***										1SD***						3D 3SD***						
Georgia	12	9D 1RC													2RC												
Hawaii	1					1LT[m]																					
Idaho																											
Illinois																											
Indiana																											
Iowa																											
Kansas																											
Kentucky	17	17D																									
Louisiana	11	11D																									
Maine																											
Maryland																											
Massachusetts																											
Michigan																											
Minnesota																											
Mississippi																											
Missouri																											
Montana																											
Nebraska																											
Nevada																											
New Hampshire																											
New Jersey																											
New Mexico	1										1D																
New York																											
North Carolina																											
North Dakota																											
Ohio																											
Oklahoma	6	1D											1D				1R				1D,1F 1BC						
Oregon																											
Pennsylvania																											
Rhode Island																											
South Carolina	44	5D,1T 1BC			1D								21D		2BC 1D,1BB						4D 2BC 1RC 2F	1D[a] 1BC[t]					
South Dakota																											
Tennessee																											
Texas	140	2D,1R 1AD***	1J 4CO 1AU***	2J	2D 4CO 2BI 1AD***	1D** 2D[n] 10P** 1J** 2J[n] 20O[n] 1R[n]					10D		10D 1BC		1D,1F 1CU 9CO 1J 3BC 5OP	1D** 1J[i]	61R				2D			2CN***			
Utah																											
Vermont																											
Virginia																											
Washington																											
West Virginia																											
Wisconsin																											
Wyoming																											
Puerto Rico	1					1RI[c]																					
Virgin Islands																											

ANH FORM 5-55 MAY 1971 — REPLACES ADE FORM 5-55, DEC 1964, WHICH IS OBSOLETE

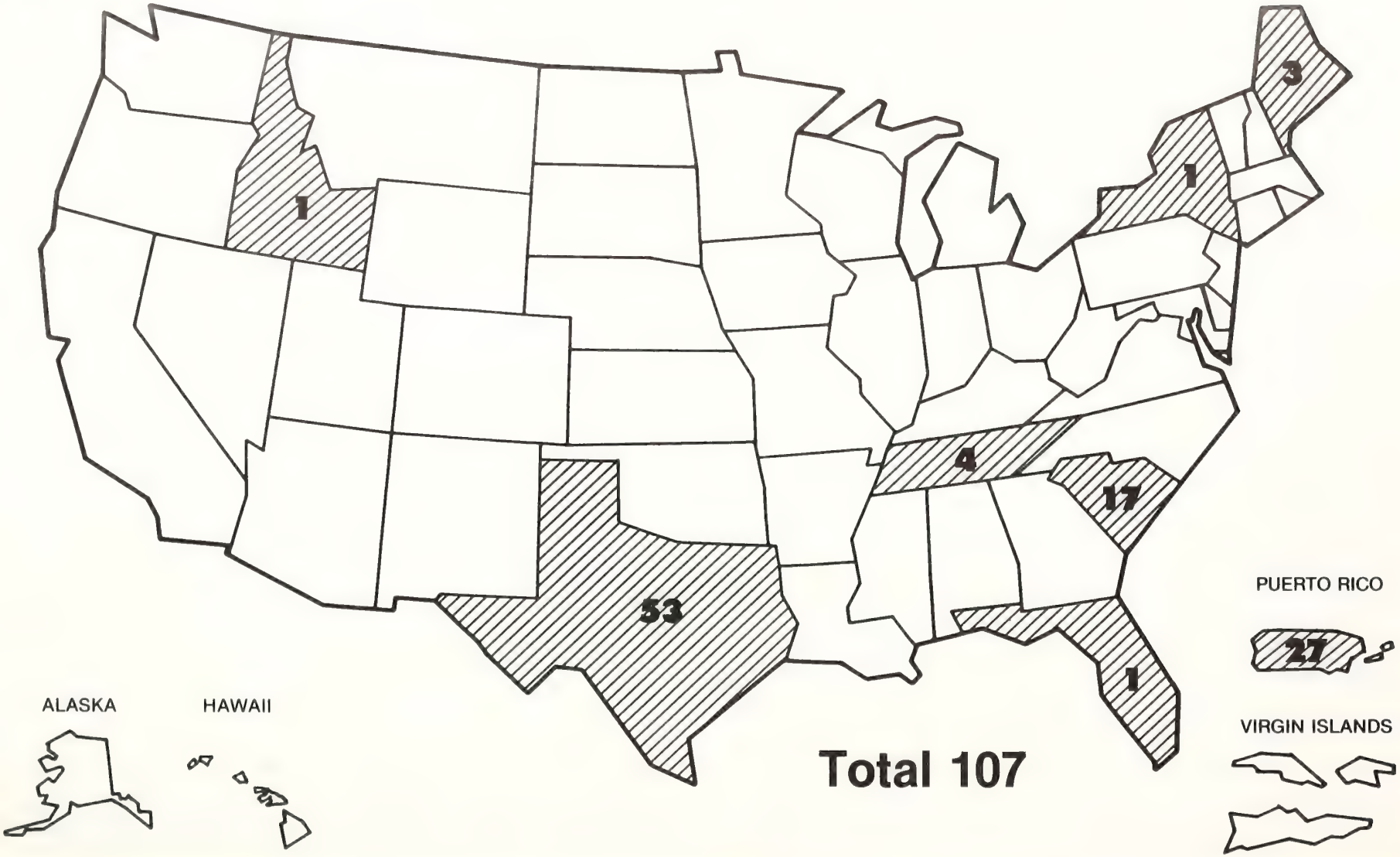
Key to Host
AD Axis Deer; AU Aoudad Sheep; BC Bobcat; BI Bison; BB Black Bear; CN Corsican Sheep; CO Coyote; CU Cougar; D Deer; E Elk; F Fox; J Javelina; LT Leopard Tortoise; OP Opossum; R Rabbit; RC Raccoon; RI Rock Iguana; SD Sambar Deer; T Wild Turkey

Key to Species
a Ixodes affinis; c Amblyomma cruciferum; i Dermacentor halli; m Amblyomma marmoreum; n Amblyomma inornatum; t Ixodes texanus

** Nymphal stage
*** Introduced species

USDA, APHIS, VS
NVSL, AMES, IOWA

Tick Collections From Zoo Animals and Miscellaneous Hosts CY 1984



REPORT OF TICKS COLLECTED

PERIOD: Calendar Year 1984

HOST: Zoo Animals and Miscellaneous Hosts

STATE	TOTAL	AMBLYOMMA AMERICANUM	AMBLYOMMA CAJENNENSE	AMBLYOMMA IMITATOR	AMBLYOMMA MACULATUM	AMBLYOMMA SPP.	ARGAS PERSICUS	BOOPHILUS ANNULATUS	BOOPHILUS MICROPLUS	BOOPHILUS SPP.	DERMACENTOR ALBIPICTUS	DERMACENTOR SILVARUM (=D. PICTUS & D. VELUTINUS & BANKSI)	DERMACENTOR MICROLINEATUS	DERMACENTOR NITENS	DERMACENTOR OCCIDENTALIS	DERMACENTOR VARIABILIS	DERMACENTOR SPP.	HAEMAPHYSALIS LEPORISPALUSTRIS	IXODES COOKEI	IXODES PACIFICUS	IXODES SCAPULARIS	IXODES SPP.	ORNITHODOROS SPP.	OTOBIUS MEGNINI	RHIPICEPHALUS SANGUINEUS	RHIPICEPHALUS SPP.	MISCELLANEOUS SPP.
TOTAL	107	9	11	1	7	9			26		2	1	2	1		16						13				7	1	1
Alabama																												
Alaska																												
Arizona																												
Arkansas																												
California																												
Colorado																												
Connecticut																												
Delaware																												
Florida	1																								1B			
Georgia																												
Hawaii																												
Idaho	1											1H																
Illinois																												
Indiana																												
Iowa																												
Kansas																												
Kentucky																												
Louisiana																												
Maine	3					1RN[h]*																					1RN[e]*	1RN[p]*
Maryland																												
Massachusetts																												
Michigan																												
Minnesota																												
Mississippi																												
Missouri																												
Montana																												
Nebraska																												
Nevada																												
New Hampshire																												
New Jersey																												
New Mexico																												
New York																												
North Carolina	1															1H												
North Dakota																												
Ohio																												
Oklahoma																												
Oregon																												
Pennsylvania																												
Rhode Island																												
South Carolina	17	1H 1Y			1H 1Y								1Q			1Y 1G,1H						2H,1Y 4RM,2Q						
South Dakota																												
Tennessee	4	1H														3H												
Texas	53	4H 2RN	4Y,1X 2H,2S 2RN	1H	1Y 2H,2S	5H** 3RN[h]					2Q		1Q			5Y 4H						4C				1H 2X,3C		
Utah																												
Vermont																												
Virginia																												
Washington																												
West Virginia																												
Wisconsin																												
Wyoming																												
Puerto Rico	27								26G					1G														
Virgin Islands																												

ANH FORM 5-55 MAY 1971

REPLACES ADE FORM 5-55, DEC 1964, WHICH IS OBSOLETE

Key to Host

B Barn	RN Rhinoceros
C Cat	RM Rhesus Monkey
G Goat	S Sheep
H Human	X Inanimate
Q Host not given	Y Swine

Key to Species

e Rhipicephalus evertsi
h Amblyomma hebraeum
p Hyalomma impressum

**Nymphal stage

*Found on recently imported trophy hides

USDA, APHIS, VS
NVSL, AMES, IOWA

*U.S. GOVERNMENT PRINTING OFFICE: 1985-490-920:20184-APHI

October 1985